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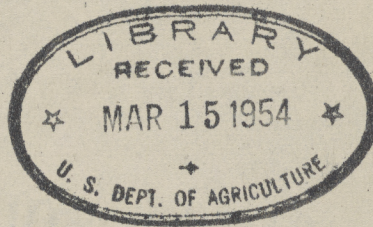
MOSQUITO CONTROL

MULTNOMAH COUNTY OREGON, 1934

By

G. F. Osler

Supervisory Superintendent



Direction of

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U. S. Department of Agriculture, Bureau of Entomology.

Division of Insects Affecting Man and Animals //

H. H. Stage, Associate Entomologist

438 U.S. Court House, (Portland, Oregon.)

September 10, 1934.

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MOSQUITO CONTROL, MULTNOMAH COUNTY, 1934

INTRODUCTION

Mosquito control has been greatly accelerated in Multnomah County during the past year with the aid of funds available by the Relief and Civil Works Administrations. Pest mosquito control work was first approved as a Federal Civil Works project on November 28, 1933, and the Divisions of Insects Affecting Man and Animals, Bureau of Entomology of the U. S. Department of Agriculture supervised the work which was organized in over thirty states. On this work alone, 22,000 men were thus given employment under the CWA program. At the request of H. H. Stage of the Above mentioned office in Portland, 1,000 men were assigned to Oregon. Seventy-five of these were placed in Tillamook County, 100 in Columbia, and the remaining 825 were allotted to Multnomah County. The organization of this work and personnel was begun early in December (1933) and was terminated February 15, 1934. A great deal of work of a permanent and semi-permanent character was done and included the clearing of 1242 acres of dense willow-brush land along the Columbia and Willamette Rivers. (It has been shown that the pest mosquitoes in the vicinity of Portland deposit their eggs on the ground in dense willow thickets inundated by the annual floods. By clearing this ground, protection is no longer afforded the pest and they cease to lay their eggs there.)

At the termination of the Federal program on February 15, the labor force was reduced considerably but continued to function as a State CWA project until April 1.

The work done up to this time was shown to be of decided benefit to land holders since it reclaimed land which had grown up to briars and willow brush, had done much toward discouraging the breeding of mosquitoes as shown above, and had provided an ideal work relief program for hand labor. The new SERA organization realizing these benefits and opportunities accordingly approved a project providing the labor necessary for the actual mosquito control program which has been managed by the Mosquito Control Committee of the Portland Chamber of Commerce and financed by Multnomah County, the City of Portland, and donations of private individuals for several years.

It was however, stipulated that the organization and direction of the work was to be done by the office of Insects Affecting Man and Animals of the Bureau of Entomology, Portland, Oregon. This project was approved as of April 15/34 and was drawn up as follows:

A Multnomah County Political Subdivision project - the SERA contributing \$14,606.00 paid up labor. The County contributing \$1,000.00 for mileage and necessary equipment and the City issuing an ordinance to the effect that this project might use any or all of the Mosquito Control equipment owned by the City of Portland.

Personnel under H. H. Stage, in charge of above division, to consist of one Superintendent, one Supervisory Superintendent, one Assistant Superintendent, five entomological scouts, and such foremen and laborers as were found advisable for the occasion up to ten foremen and eighty laborers.

The Superintendent, Supervisory Superintendent, and Assistant Superintendent to be selected at random from a list of six men all of whom had had experience in Mosquito Control. This list was submitted to the SERA by H. H. Stage at their request. These were to be on full time.

The scouts, foremen and laborers to be taken from the relief roles, and rotated as per requirements of the SERA.

This project drawn up and approved was to all intents and purposes ready to start April 23, 1934, only to have it announced that before it could get under way, funds to cover the entire project as required by the State Industrial Accident Insurance Company would have to be found.

At first the rates for this project were announced as 7.5%, thus bringing the requirements for insurance alone to a figure in the neighborhood of \$1,100.00.

It was immediately set about to obtain this amount. The County Commissioners were interviewed and the situation fully explained to them with the result that they not only contributed an additional \$250.00 over and above their original \$1,000.00, but also arranged for a complete analysis of the records of the Mosquito Control carried on under the CWA. This was done in an effort to reduce the rate of the Insurance.

The analysis showed a very small list of casualties and together with an interview with the State Insurance Commissioners brought about a change in rates, reducing the required amount from \$1,100.00 to approximately \$500.00. This action left \$250.00 to be raised.

The next move was to contact such of the larger concerns in the County as were most benefitted by Mosquito Control. The ultimate result of these contracts was as follows:

Jantzen Beach	donated	\$100.00
P. E. P.	"	50.00
Ladd Estate	"	50.00

thus all but completing the quota.

In order to be secure of having sufficient funds, letters explaining the situation and requesting \$10.00 or \$15.00 donations where possible, were mailed to all the Golf Courses bordering the Columbia River. Of all those contacted, the Lloyd and Wildwood Courses were the only ones to contribute. These Golf Courses responded to the amount of \$10.00 each. This is to be greatly regretted as all are benefited to a great extent by a reduction of the mosquito pest.

The total assets of the project were now as follows:

SEMA paid up labor	\$14,800.00
County funds for material & ins.	1,250.00
Private Contributions	220.00

The necessary funds having been found, the project was started and the first foreman requisitioned May 7, 1934.

SYNOPSIS OF PROJECT FINANCE

Appropriated by the S.E.R.A. - - - - -	\$14,806.00
in paid up labor	
Amount used - - - - -	11,563.00
Amount left unused - - - - -	3,043.00

Appropriated by the County	
For materials and Equipment - - - - -	\$ 1,000.00
For Insurance - - - - -	250.00
Appropriated by the City	
For wages and Insurance - - - - -	\$ 250.00
Appropriated by Private contribution	
For wages, Insurance and miscellaneous - - - - -	\$ 267.50
Total Assets.	\$ 1,787.50

Project Expenditures

May		July	
Insurance	\$101.68	Insurance	\$ 90.55
Wages	22.00	Wages	132.00
Mileage	- --	Mileage	130.65
Oil	353.00	Oil	- --
Miscellaneous	5.40	Miscellaneous	21.86
	<u>\$381.08</u>		<u>\$375.06</u>
June		August	
Insurance	\$ 85.00	Insurance	\$ 90.00
Wages	155.00	Wages	211.00
Mileage	207.20	Mileage	200.00
Oil	- --	Oil	- --
Miscellaneous	60.86	Miscellaneous	
	<u>\$ 510.06</u>		<u>\$501.00</u>
		September	
		Total Expense	\$ 20.50
			<u>\$ 20.50</u>
		Total Expenditure	<u>\$1,787.50</u>

June 25th---Laborer skinned his shin. First aid.
No time lost.

August 2nd---Laborer reported infection of poison
oak. One treatment. No time lost.

N.B. Several other laborers were infected with poison
oak, but no treatment was necessary and no time
was lost.

The project employed an average of 50 men per week for nineteen weeks, or an aggregate of 950 men. Of these, one reported a major accident and three reported minor accidents. The percentage of accidents of all kinds is therefore .31%.

When, on September 14th the project came to a close, it still showed a credit of some \$3,000.00 worth of paid up labor available from the S.E.R.A.

This was unavailable, however, due to the lack of necessary funds for insurance.

Inasmuch as this was the case and inasmuch as the percentage of accidents was so low it seems regrettable that a lower rate of insurance could not have been settled upon.

SYNOPSIS OF INSURANCE

In order that the project could be started it was necessary to have it insured in compliance with the State Industrial Accident Commission. The rate was a blanket rate of $7\frac{1}{2}$ percent per man. In view of the type of work carried on by the project namely that of oiling swamps and cutting brush, this seemed unnecessarily high.

An analysis of the previous Mosquito Control carried on under the C.W.A. was made and a very small percentage of accidents was shown.

Rates were revised and the following ones finally decided upon:-

Superintendent - - - - -	-7%
Assistant Superintendent - - - - -	-7%
Supervisory Superintendent - - - - -	-.60%
80% of the Laborers - - - - -	3%
20% of the Laborers - - - - -	7%
Office Staff - - - - -	.05%

Insurance paid by the project for 1934

May - - - - -	\$101.68
June - - - - -	86.00
July - - - - -	90.55
August- - - - -	100.00
TOTAL	\$378.23

Accidents Incurred During Operations.

Major Accidents:

August 15th ---Laborer cut his foot with an axe,
10 days in hospital. Not reassigned
to work.

Minor Accidents:

June 18th---Laborer got stick in his eye. One treat-
ment by Doctor. No time lost.

SYNOPSIS OF WORK REPORT

A report by weeks of the number of men used on the project. It shows the number requisitioned and the number that failed to show up for work.

April

	<u>Requisitioned</u>	<u>Short</u>
Week ending 30th		
Superintendent	1	-
Supervisory Supt.	1	-
Assistant Supt.	1	-
N.B. These three men carry on through the entire project.		

May

	<u>Requisitioned</u>	<u>Short</u>
Week ending 3rd		
Foremen	5	-
Timekeeper	1	-

	<u>Requisitioned</u>	<u>Short</u>
Week ending 10th		
Foremen	5	-
Laborers	35	-
Stenographer	1	-
Timekeeper	1	-

	<u>Requisitioned</u>	<u>Short</u>
Week ending 17th		
Foremen	5	-
Laborers	35	5
Stenographer	1	-
Timekeeper	1	-
Entomological Scouts	5	-

	<u>Requisitioned</u>	<u>Short</u>
Week ending 24th		
Foremen	5	-
Laborers	35	5
Stenographer	1	-
Timekeeper	1	-
Scouts	5	-

	<u>Requisitioned</u>	<u>Short</u>
Week ending 31st		
Foremen	5	-
Laborers	35	7
Stenographer	1	-
Timekeeper	1	-
Scouts	0	-

June

	<u>Requisitioned</u>	<u>Short</u>
Week ending June 7th		
Foremen	5	-
Laborers	35	7
Stenographer	1	-
Timekeeper	1	-
Sheet Metal Worker	1	-

	<u>Requisitioned</u>	<u>Short</u>
Week ending 14th		
Foremen	5	-
Laborers	35	5
Stenographer	1	-
Timekeeper	1	-

	<u>Requisitioned</u>	<u>Short</u>
Week ending 21st		
Foremen	5	-
Laborers	50	5
Stenographer	1	-
Timekeeper	1	-
Scouts	4	2

	<u>Requisitioned</u>	<u>Short</u>
Week ending 28th		
Foremen	5	-
Laborers	55	5
Stenographer	1	-
Timekeeper	1	-
Scouts	4	2

July

	<u>Requisitioned</u>	<u>Short</u>
Week ending 5th		
Foremen	5	2
Laborers	55	5
Stenographers	2	-
Timekeeper	1	-

	<u>Requisitioned</u>	<u>Short</u>
Week ending 12th		
Foremen	5	-
Laborers	50	6
Stenographers	2	-
Timekeeper	1	-

	<u>Requisitioned</u>	<u>Short</u>
Week ending 19th		
Foremen	5	-
Laborers	50	5
Stenographers	2	-
Timekeeper	1	-

	<u>Requisitioned</u>	<u>Short</u>
Week ending 26th		
Foremen	3	-
Laborers	50	7
Stenographer	1	-

August

<u>Week ending</u>	<u>Requisitions</u>	<u>Short</u>
<u>2nd</u>		
Foremen	3	-
Laborers	50	7
Stenographer	1	-
<u>8th</u>		
Foremen	3	-
Laborers	50	16
Stenographers	2	-
<u>16th</u>		
Foremen	3	-
Laborers	50	16
Stenographers	2	-
<u>23rd</u>		
Foremen	3	-
Laborers	50	8
Stenographers	2	-
<u>30th</u>		
Foremen	3	-
Laborers	50	8
Stenographers	2	-
<u>September</u>		
<u>6th</u>		
Foremen	0	-
Laborers	15	-
Stenographers	2	-
<u>13th</u>		
Stenographers	2	-

SYNOPSIS OF EQUIPMENT

Equipment furnished by the City of Portland.

- 1 only 24 foot boat "Wiggler" with Johnson outboard motor.
- 1 only hand pump power spray.
- 100 feet of rubber hose.
- 4 only faucets for oil drums
- 3 only trailers for transportation purposes
- 22 only "Myers" 5 gallon knapsack oil spray cans

Equipment furnished on requisition by the SERA

- 50 pairs rubber hip boots
- 2 only kits, First Aid
- 2 only Portable Emery Wheel
- 2 only Wrenches, Crescent 8"
- 2 only cans, Milk, 10 Gal
- 2 only Bucket, Galvanized
- 4 only Dippers
- 2 only Saws C. C. 6'
- 4 only Handles Saw, C.C.
- 12 only Forks (Short Handles)
- 30 only Axes, D.B.
- 8 only Hooks, Brush
- 2 only Mattocks
- 2 only Handles, M & P
- 6 Only Shovels L. H. S. P.
- 4 only Boxes, Tool
- 5 only Padlocks & Keys
- 4 only Haythes (brush)
- 12 only Shovels L. H. Rd. Pt.
- 4 only Wrenches, Monkey

MOSQUITO CONTROL REPORT

PERSONNEL

Non-rotating:-

Ray Bilyeau - Superintendent
G. F. Osler - Supervisory Superintendent
James Taylor - Assistant Superintendent

This administrative staff started on April 24th. James Taylor resigned June 16th and his place was taken by R. C. Hughes, starting as of June 20th.

Rotating:-

Foremen:

The men allotted this project were to be divided into several gangs, each gang to have a foreman. It was the foreman's duty to see that the jobs given his gang were done properly, to report absences, and to report accidents. Also he was responsible for the tools and tool box. These foremen were taken from the relief roles of the SERA and as they had had little or no experience in Mosquito Control it was necessary to have them requisitioned a week or two before the men so that the Superintendent could train them sufficiently to handle their jobs. The efficiency of these men was somewhat reduced because of the necessity for rotating them every two weeks.

Entomological scouts:-

As there are a great number of Mosquito Breeding areas in Multnomah County as there is a great variance in the outbreak of their broods it is necessary to keep a continual check almost day by day on the entire county so that the oiling crews may be warned in time to treat the most urgent areas.

That this might be effectively carried out, the County was divided into five areas and each area was allotted an Entomological Scout.

He was to be entirely responsible for the success of the control in his area. He was to make continual rounds, taking samples of mosquito larvae, to report the breeding areas, and to check on the control after the areas had been treated.

Unfortunately the SERA relief roles had no one who had any idea or knowledge of Mosquito Control or of the possible breeding areas or of mosquito larvae with the result that this division of work which could and should have been more efficient and most useful turned out to be quite the weakest spot in the entire set-up.

There were five men requisitioned but although they worked hard, due to their lack of experience they were unable to accomplish the work desired from them.

The outcome of this situation was that two men well acquainted with this type of work were employed and paid directly from the private funds of the project.

The Laborers:-

The laborers were requisitioned through the SERA. They were directed on their employment cards where and when to report for work and it was up to them to get to the designated spot as best they could. After the first day they generally managed to arrange with one another how best to get to and from work. They were changed every two weeks. For the most part they were quite regular and with the exception of two occasions, nearly all men requisitioned reported as directed.

TIMEKEEPING.

Timekeeping:-

At the beginning of the project the SERA furnished a timekeeper whose duty it was to make the rounds of the entire project twice a day and to hand in his timebook each week. This timekeeper was paid by the project and was rotated every two weeks.

On July 20th a new system was started. This system required the foremen on the project to keep the time and turn it in daily to a Master timekeeper. The master timekeeper to be responsible for the time of several projects and part of his salary to be paid by each project on which he worked. He was not rotated.

FINANCE.

A statement of expenditures and other statistical data may be seen on page five.

The payroll for the project was handled by the SERA. The timekeeper brought the checks to the men out in the field every Tuesday. Those men who had finished their work period and were not in the field reported

to the Auditorium Tuesday mornings. This system was used throughout the entire project with the exception of one change. On July 20th when the timekeeping system changed, the timekeeper no longer took the checks to the men in the field. Instead, this duty was taken over by the Superintendent.

The necessity for hiring the two special Entomological scouts brought on an added expense. Also during June it was announced that the Supervisory Superintendent and Assistant Superintendent although not rotated would nevertheless be paid for only the first four days in each week. As it was necessary for them to work full weeks, this meant that the project would have to pay them for the remaining day and a half per week. To cover these new expenditures more funds were required.

A meeting of the Mosquito Control Committee of the Portland Chamber of Commerce was held and the situation discussed. The result was that a committee was appointed to raise \$250.00. As the City had to date contributed the use of tools and equipment only, it was approached. The outcome of this interview was that the City promised the entire \$250.00, and as the project was due to close on or about the middle of July, this left an ample margin for the extra wages and any incidentals that might arise.

In the middle of July the SERA issued a letter to all projects requesting them to keep going as long as possible and to put on more men. As the project still had almost half its labor allotment left and since much more work of a semi-permanent type of control could be accomplished during the low waters of the summer time it was decided to keep the project going as long as possible.

This meant another month or six weeks insurance and although there was a small margin available it was insufficient to meet the insurance and other expenses that another month and a half's work would incur. Additional donations were requested and the following amounts were received -

Dairymen of Seavies Island	\$32.50
Blue Lake Amusement Park	20.00
Jantzen's Beach	25.00

EQUIPMENT.

A full list of all equipment and materials used is to be found on page seven. Practically all the tools and tool boxes used were requisitioned from the store rooms of the SERA, and were the tools that were used by the various projects during the CWA regime.

During the early months of the project while the water was high, and there was much oiling to be done, most of the men had to have rubber boots. These were obtained from Tillamook where they had been stored, after the CWA Mosquito Control project there had been completed.

Oil sprayers, trailers and boats, and such other equipment as was used were the property of the City of Portland, and had been used in previous years by them in Mosquito Control.

The oil used was a light Diesel fuel oil, and was purchased through the county from the Associated Oil Company with money from the thousand dollars allotted by the county for materials and supplies.

It is well to note that although all tool boxes were kept under lock and key, there were several broken into and quite a number of tools stolen.

The many exchanges of tools made necessary by the changing field conditions were made easy by the fine cooperation of the storehouse department of the SERA.

Miscellaneous work in upkeep included caulking and painting the City boat "Wiggler" and replacing old tires on the City trailers.

TRANSPORTATION:

The mosquito breeding areas in Multnomah County are to be found in widely scattered areas and therefore, it was often necessary to have men report for work some distance from Portland.

The project had no private or definite mode of transportation for the men and it was left entirely up to them to get on the job as best they could. A large percentage of them had cars of their own and those that had not generally managed to arrange with those who had to give them a lift.

On one or two occasions it was found that a man allotted to a certain job lived some distance away and nearer another job of the same project. In cases of this kind, and if reported to the foreman, he was changed to the job nearest his home and a man more conveniently situated put in his place.

MILEAGE:

Mileage at the rate of five cents per mile was given to the Superintendent, Supervisory Superintendent and the Assistant Superintendent throughout the entire project. In addition to this mileage, mileage was allowed such foreman whose cars were on occasions used specifically for the transportation of men or equipment to some special assignment.

Mileage for the entire project amounted to approximately \$861.60.

The superintendent reported that in order to watch all phases of the work, and have oil boats and equipment on the different jobs ready

for use it was necessary for him to run his car approximately 6,000 miles.

Money used for mileage was taken from the \$1,000.00 appropriated by the County for materials and supplies.

CONTROL

Of the mosquitoes to be found in Multnomah County, Oregon, only two species are to be considered any serious pest. These two, Aedes vexans, and A. aldrichi, are known as flood water mosquitoes. They breed in the swales and low ground along the banks of the river which are flooded yearly by the spring rise.

Eggs laid in the late summer when the water is low and the swales are dry, hibernate during the winter months in this form. In the spring when the river rises with the spring freshets the swales are inundated and the eggs hatch into wrigglers. They remain about ten days in this stage and then become pupae. In about three days they emerge from the pupal stage to become adult mosquitoes. During the approximate six weeks of their life as adults they in turn lay their eggs and the whole cycle is repeated.

TEMPORARY CONTROL:

The primary aim of this project was to effect a temporary control by destroying this year's hatches of mosquitoes whilst in the wriggler and pupal stages. This is done by spraying oil on the water surface of the infested areas and due to the short period in which the mosquito remains in these stages it limits the time for treatment.

If the infested areas are not treated at this crucial time, the adult mosquitoes emerge from the water and once on the wing they are impossible to control.

Unfortunately for this years control the actual start of the project was delayed three weeks by the last minute information that it was necessary to find insurance for the entire project. This appeared an unsurmountable task and although the money was eventually provided, a large percentage of this years hatch was already too far advanced throughout the entire country to ensure a complete control.

Also due to the six hour days and four day weeks allowed the laborers under the SERRA, the efficiency of the control was further hampered.

In spite of such handicaps as these a fairly thorough temporary control was carried out and the mosquito pest was not a troublesome one in this vicinity this season.

Three thousand twenty four gallons of oil were used. Areas treated included the flooded swales on Hayden Island and St. John's peninsula, areas on the east end of Sauvie Island, areas around Blue Lake, The Oaks and Kock's

Bottom. Also a variety of other smaller areas along the banks of the Columbia between the Sandy River and Hayden Island.

SEMI-PERMANENT CONTROL:

In addition to the temporary control by oiling the project carried on some semi-permanent and some permanent control.

The semi-permanent control consisted of clearing willow brush and debris from numbers of the mosquito breeding areas. All the slashings were piled and burned. This was done because it was found that by cleaning up and opening up areas in this fashion ^{it} so changed the ecology of the ground as to make it unsuitable for mosquito propagation.

Areas treated in this form are marked on the map on page in yellow and the acreage cleared and burned is as follows:

Hayden Island	75 acres
Sauvies Island	50 acres
? - Oaks Bottom	150 acres
Blue Lake	30 acres

making a total of 305 acres in all.

PERMANENT CONTROL:

Permanent control consisted of draining and filling.

The majority of this type of work was carried on, on Hayden Island. Two drainage ditches controlling and opening up two large willow swale breeding areas were dug. These two ditches, one 850 feet long the other 680 feet long connected the breeding areas directly to the Columbia River in such a way that when the floods are over and the river receded the water in these areas will recede immediately also. Both of these ditches required culverts under the road. The culverts were made of wood and are two feet by three feet with a fourteen foot fill on top. Pictures of these ditches and culverts may be seen on pages 24 and 25.

At the east end of Little's farm on Hayden Island, a large piece of the Columbia River dyke had been washed away. This not only allowed the early flooding of an 80 acre swale but also made transportation beyond this point impossible. The project replaced this piece of dyke making a 1,183 yard fill rip rapped and sand bagged. This fill now controls a vast area of breeding ground and makes transportation of oil and materials possible for two or three miles farther down Hayden Island.

The project was helped very materially on this fill by Mr. Little and Mr. Benson. They both loaned teams for the full four weeks needed for the construction. A picture of this fill and of the controlled area may be seen on page 26.

Some additional 3,800 feet of roadway washed out during last years high water was replaced and two miles of new trail across the island was cut.

The new trails lead from the island road to two of the largest breeding areas on the south coast of Hayden Island. They are cut through dense thickets and are wide enough to allow a car and trailer thus speeding up the transportation of oil immeasurably.

Pictures of these trails to be seen on pages 27. In one or two instances in such area such as the Oaks Bottom, light clearing of brush was necessary to maintain the primary clearing which was done with funds furnished by the Civic Emergency Committee during the winters of 1931 and 1932.

CONCLUSION

In spite of the several handicaps suffered by the project this year, it is felt that a fairly thorough control was established and the mosquito pest consequently reduced throughout the county for this season. Compliments bearing out this belief have been handed to the Project not only by some of the larger organizations benefited by the work but also by the farmers and dairymen of the county.

The SMRA should be given full credit for the Mosquito Control activities of this season since without their funds with which to hire labor the City and County allotments would have been wholly inadequate.

It is now definitely proven that mosquito control in Multnomah County is not only possible but practical.

The prerequisites of an adequate control are first of all approximately \$7,000.00 to cover labor and material and secondly a reliable personnel including a capable administrative staff and five scouts having had some previous Entomological training.

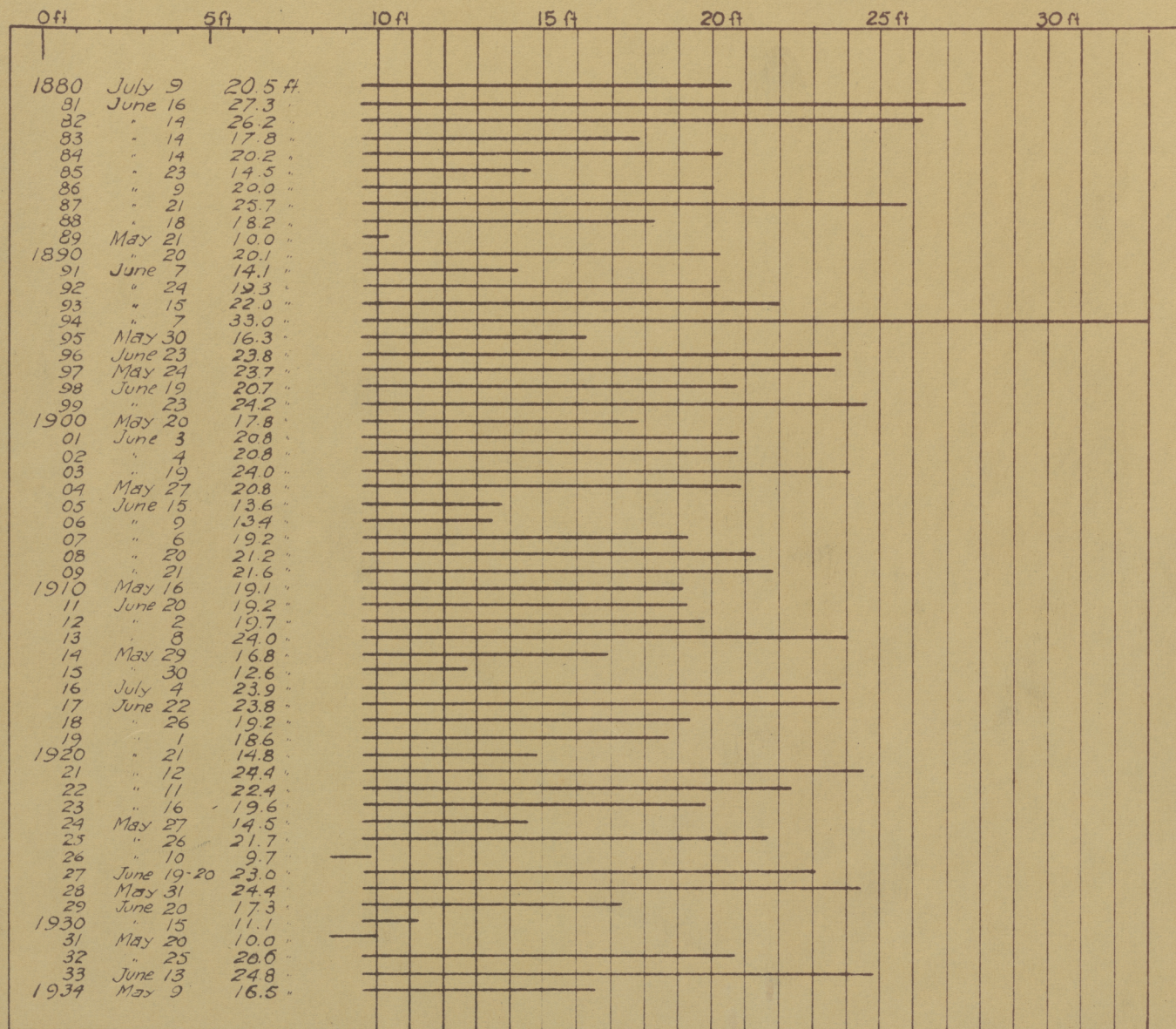
It must be noted that a set up of this kind would deal solely with temporary control by oiling and would not provide for any semi-permanent or permanent control.

For efficiency in future control, it is suggested that a motor driven power sprayer and a power boat sufficiently large to handle this equipment and crew would be of the utmost value.

CREST HEIGHTS OF SPRING FLOODS IN COLUMBIA RIVER.

1880 - 1934

U.S. ENGINEERS GAGE, PORTLAND, ORE.



Crest Heights of the Spring floods of the Columbia River have a direct influence on the numbers of flood water mosquitoes produced in Multnomah County. The higher floods, of course, spread out over a greater area and so flood more eggs which have been laid more or less haphazardly on the ground in the willow swales and low cottonwood ridges along the river.



Hayden Island. Shows vast breeding areas cleared of willow thickets. These areas are flooded at a normal spring rise of the river.



Hayden Island. A close-up of the clearing being done in the brush and other willow covered breeding areas.



Hayden Island. Showing type of willow brush clearing necessary for semi-permanent control.



Hayden Island. Another view of above area. During the summer low water, such work as this may be carried out very efficiently.



Oaks Bottom.
A dense willow brush thicket after clearing.



Oaks Bottom. After Clearing. Innumerable stubs may be seen
where the brush has been cut.



Sauvies Island. A heavy mosquito producing area. Dense willow brush on the right of the picture will be cleared as is shown on the left.



Sauvies Island. A willow thicket after clearing.



Hayden Island. Clearing dense willow thickets of brush where mosquitoes deposit their eggs on the cool moist soil.



Sauvies Island. A particularly heavy breeding area before clearing up the debris.



Sauvies Island. Dense willow brush in back ground with cleared area in foreground. This ground is covered by water at ordinary floods and has been a prolific breeding area.



Sauvies Island. A close-up of the dense willow thicket shown in the back ground of the picture above.



Blue Lake. Drainage Ditch after clearing banks.



Blue Lake. Clearing banks of drainage ditch which drains a 40 acre swamp.



Hayden Island. After the flood has receded. Mosquitoe eggs are deposited on the ground in the willow brush along the margins of such a slough as this.



Hayden Island. Another slough which produces mosquito larvae when flooded beyond its banks.



Hayden Island. A large drainage ditch from a low breeding area into the Columbia River.



Hayden Island. A vast breeding area now almost entirely drained and controlled by ditch and flood gates.



Hayden Island. A bridge with flood gate to keep out the Columbia River. This work was done with SERA labor.



Hayden Island. Showing area drained and controlled by flood gate shown above.



A reconstructed dyke which was washed away by the 1933 flood.



The swale here pictured has been a heavy mosquito producing area and was flooded by water from the Columbia River which is now held back by the dyke pictured above.



Hayden Island - Trails wide enough for automobile travel have been cut through heavy brush so that oil and equipment may be transported to mosquito breeding areas.



Hayden Island - As above.



Transportation of oil is done in drums and carried into the field where needed by means of a trailer.



When a breeding area is reached the oil is placed in 5 gallon sprayers.



Oiler equipped with a "Myers" 5 gallon knapsack sprayer.



Rear view of oiler with same knapsack sprayer.



The "Wiggler". Now boat used to haul hand-power sprayer for oiling. Large areas can be quickly oiled by this method.

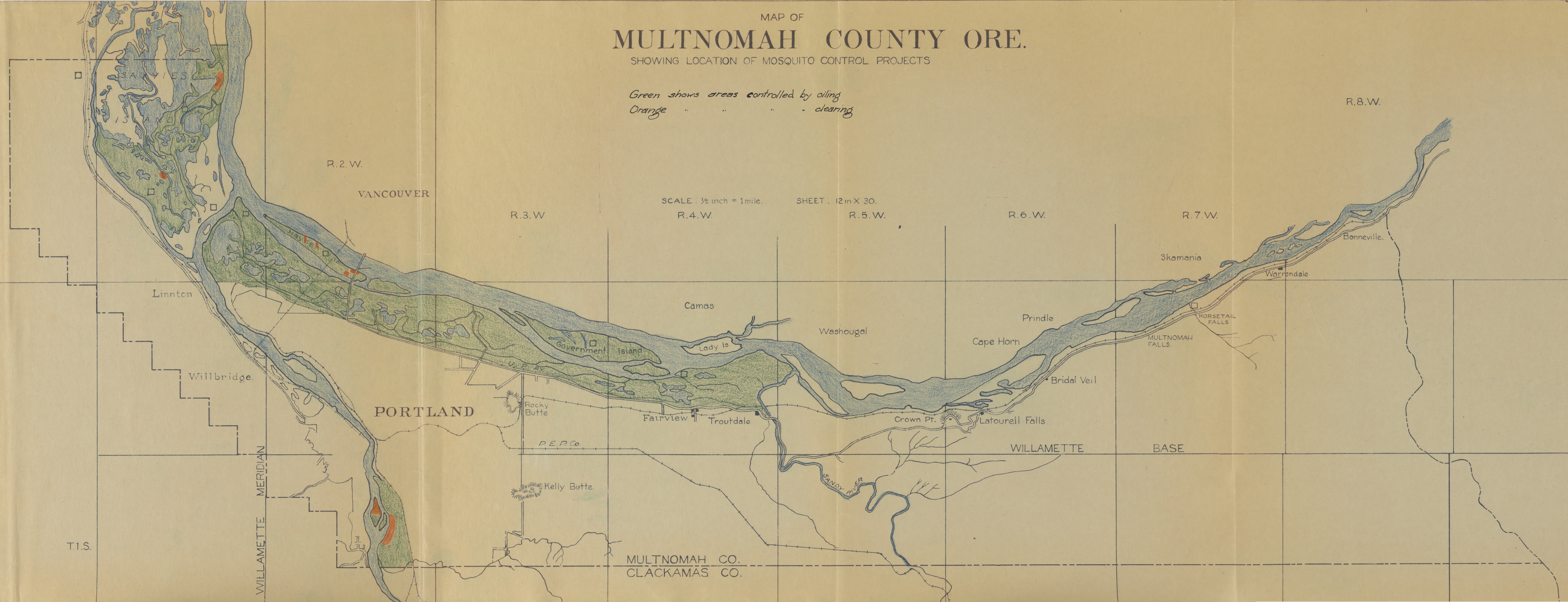


Hand spraying oil on water which is infected with mosquito wigglers. This method is more expensive and not as effective as that pictured above.

MAP OF
MULTNOMAH COUNTY ORE.

SHOWING LOCATION OF MOSQUITO CONTROL PROJECTS

Green shows areas controlled by oiling
Orange " " " " clearing



MAP OF
MULTNOMAH

SHOWING LOCATION OF MOSQUITO

*Green shows areas controlled by
Orange " " " "*

SCALE : 1/2 inch = 1 mile.
R.2.W. R.3.W. R.4.W. SH



MAP OF
MULTNOMAH COUNTY ORE.

SHOWING LOCATION OF MOSQUITO CONTROL PROJECTS

Green shows areas controlled by oiling
Orange " " " " clearing

SCALE: 1/2 inch = 1 mile.

SHEET: 12 in X 30.

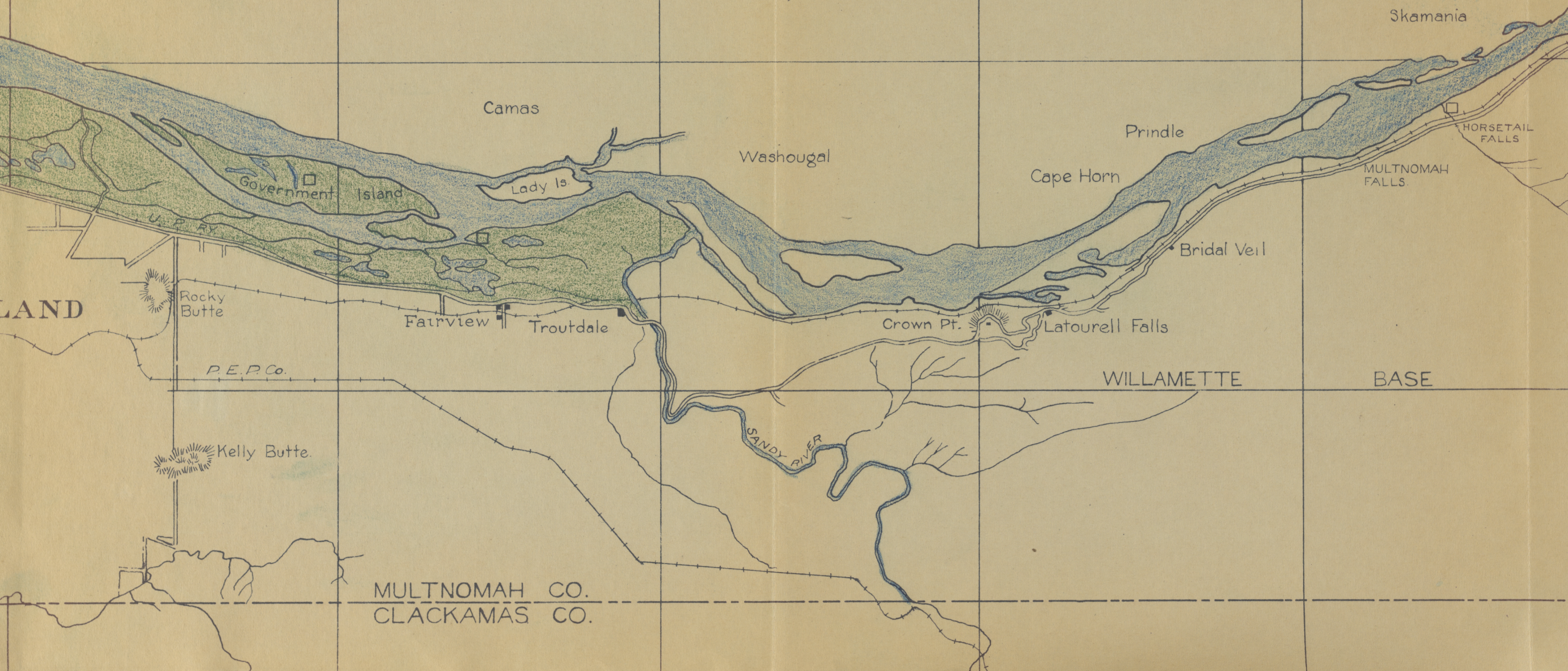
R.3.W

R.4.W.

R.5.W.

R.6.W.

R.7.W.



COUNTY ORE.

TO CONTROL PROJECTS

by oiling
clearing

HEET: 12 in X 30.

R. 5. W.

R. 6. W.

R. 7. W.

R. 8. W.

